

CLAIMS

- Sub (A2)
1. A process for handling and stacking a plurality of thermoformed containers or lids, which comprises the following sequence of phases:
- obtaining during a thermoforming phase mouldings of lids and containers, having at least
 - 5 three stacking protrusions or spacers, all having the same space arrangement in all the thermoformed products of the same moulding, at least one of the stacking protrusions or spacers of a same thermoformed object being set out in a non specular symmetric way with respect to at least a centre line of the respective container or lid and at a distance from the same centre line of the respective container or lid different from that of the others,
 - 10 - arranging one or a moulding of said containers or lids in at least one support template to keep them in order according to the spatial arrangement that they had during the thermoforming phase,
 - turning through a predetermined angle every other object or moulding of objects either containers or lids before or during their transfer to a stacking station, and
 - 15 - stacking mouldings of thermoformed containers or lids with alternate mouldings turned through said predetermined angle, so as to obtain stacks of containers or lids, where the stacking protrusions of a container or lid are offset with respect to those of the next container or lid in each stack.
2. A process according to claim 1, wherein the said rotation phase includes
- 20 picking up a moulding of thermoformed objects from a supporting template,
 - turning the said moulding or the single containers or lids of said moulding, while the said thermoformed objects are lifted, and
 - placing the said thermoformed objects rotated through the said predetermined angle on the same template or on another template loaded with thermoformed objects that have not
 - 25 been turned.
3. A process according to claim 1, wherein the said containers or lids are rotated through an angle of 180°.
4. A plant for handling and stacking thermoformed containers or lids having at least three projections (8a, 8b) acting as stacking spacers, at least one of which is arranged at non
- 30 specular symmetry with respect to at least a centre line (m-m) of the respective container or lid (2), said plant (1) including, in sequence, a receiving station (3) for a container or lid or a moulding of containers or lids (2), at least a stacking or working station (6) for said containers or lid (2), a stacking station (4) for said containers or lids (2), means (5, 50) of transferring the containers or lids (2) from the receiving station (3) to the stacking station

(4) through each working or handling station (6), and is characterized in that at least one of the said handling stations (6) includes handling means (17) arranged to rotate through a predetermined angle every other moulding of containers or lids (2) before or during their transfer to said stacking station (4), thereby obtaining stacks (7) of lids or containers (2),
5 where the stacking spacers (8a, 8b) of a container or lid (2) are angularly offset with respect to those of the next container or lid.

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5. A plant according to claim 4, wherein said handling means comprises a support structure (15,16) and a head or unit (17) for picking up samples of a moulding of thermoformed products (2), which is rotatably supported rotatably and can be lift and
10 lowered on said support structure (15, 16).

6. A plant according to claim 5, wherein said picking up unit (17) comprises a support member (19) rotatably mounted around a vertical axis on said support structure (15, 16), a multiplicity of spacers (20) carried by said support member (19) and extending downwards, and a holding means (21) carried by each said spacer (20) and spaced apart with respect
15 to the remaining holding means (21) according to the configuration of a moulding of thermoformed products (2) transported by said transfer means (5, 50).

7. A plant according to claim 6, wherein said holding means (21) includes suckers.

8. A plant according to claim 6, including a geared motor unit (18) for controlled rotation of said support member (19).

20 9. A plant according to claim 6, wherein said support structure includes a fixed support (16), an overhanging arm (15) having one end thereof slidably mounted along at least a vertical guide (16a) on said fixed support (16), and drive means (16b, 16c) to cause said overhanging arm controllably to lift and lower.

10. A plant according to claim 6, wherein said handling means includes a robot (60)
25 having at least an overhanging arm (15) mounted for rotation either around a horizontal axis to carry out raising-lowering movements for said support member (19) or around a vertical axis to transfer mouldings of thermoformed products (2) away from said transfer means (5,50).

11. A plant according to claim 10, wherein said robot comprises drive means (62) and
30 guide means (65) to carry out movements from and to said handling station (6).

12. A plant according to claim 4, wherein said handling means include at least a support template (9a-12a) for a moulding of thermoformed objects (2), a support frame (39-42) carried by said transfer means (5,50) for each support template (9a-12a) and having a

circular opening at which a respective template (9a-12a) is rotatably mounted, and drive means for causing said template (9a-12a) controllably to rotate upon control.

13. A plant according to claim 4, wherein said transfer means comprises at least one rotating conveyer (5) with a plurality of arms (9-12).

5 14. A plant according to claim 4 wherein said transfer means comprises at least one linear conveyer (50).

15. A plant according to claim 13, comprising a single station thermoforming press (31) with cut and form mould (32) having a suction plate (30) for picking up thermoformed objects (2) thermoformed therein and arranged to discharge mouldings of thermoformed products
10 (2) at said receiving station (3).

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